Test - Chapters 22 and 23 June 13th
Omit your lowest test - no makeups

Current, Voltage and Resistance

Symbols for circuit elements
Electric power

We talked about charge, q.
Measured in Coulombs, C and is caused by the presence of electrons and protons(mostly).

The charge of an electron or proton has a magnitude of $1.602 \times 10^{-19} C = e$

Electric current, $\mathbb{I}$, is the rate of electric charge flow - amount of charge per unit time.
equation: $\mathbb{I} = q/t$ units: Ampère, A
where 1 A = 1 C***/s***

Voltage - is the electrostatic energy/per unit charge.
equation: V=energy/charge
units: Volts, V = J/C

How do you produce current and voltage?

3 main ways - generators (magnet near a coil of wire moving), batteries (chemical reactions) and photoelectric cells (photons kick electrons).

Power output is the product of the voltage and current.
P=VI = J/C x C/s = J/s = Energy/time in Watts, W

eg. A battery is listed as 6.0V and connects through a light bulb that changes electrical energy into light and heat. If a 0.20 A current flows through

the light bulb,

a) What is the power of the light bulb?
   P=VI = 6.0V x 0.20A = 1.2W
b) How much energy is dissipated in 1.0 minute through the light bulb?
   P=energy/time so energy = Pt
   1.2Wx60s= 72J as light and heat
c) How many electrons flow through the bulb in 1.0 minute?

$\mathbb{I}$=q/t q= current x time = 0.20Ax60s
q = 12C (1e/1.602x10^{-19}C)
12/1.602=7.4906 = 7.5x10^{19}electrons

p451 Q1-4

Ohm's Law - not really a law - it is a definition of resistance, R.

resistors - devices that dissipate electrical energy as heat. This can control the current and voltage in other devices.

resistance is the ratio of voltage dissipated in a device and the current through that device.

$R=V/I$

units: Ohms, $\Omega = V/A$

Ohmic devices are where the resistance is constant even though the voltage and current changes.

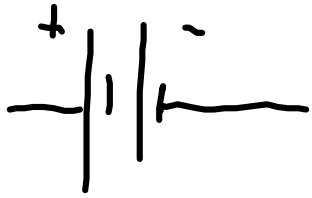
Resistors are Ohmic, light bulbs are a bit off, diodes are way off.

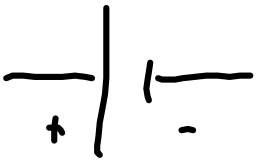
So, in the previous problem where we had a light bulb with 6.0V and 0.20A, the resistance of the bulb was:

$R=V/I = 6.0V/0.20A = 30\Omega$

Lab Friday - series and parallel circuits

diagrams:

battery: 

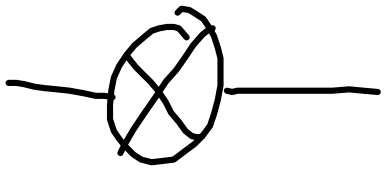
Cell 

resistor 

european

Variable resistor 

light bulb 



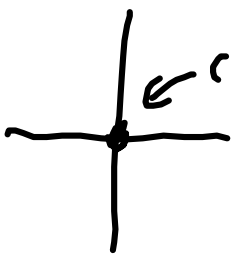
Ammeter 

measures current

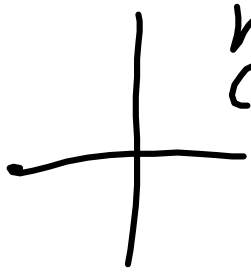
Voltmeter 

measures Voltage

p454 Q5-10

book 

connected



not connected